

IDC60485.US.SEQ.LIST.txt  
SEQUENCE LISTING

<110> (inventor) Burian, Jan  
(inventor) Kuzyk, Michael  
(inventor) Thornton, Julian  
(inventor) Kay, William

<120> VACCINES AND AGENTS FOR INDUCING IMMUNITY AGAINST  
RICKETTSIAL DISEASES, AND ASSOCIATED PREVENTATIVE THERAPY

<130> IDC01/60485/US

<140> US 09/677,374  
<141> 2000-09-15

<150> US 60/154,437  
<151> 1999-09-17

<150> NO 20004637  
<151> 2000-09-15

<150> IE 2000/0752  
<151> 2000-09-18

<150> GB 0022825.4  
<151> 2000-09-18

<150> CL 2544-2000  
<151> 2000-09-15

<160> 20

<170> PatentIn version 3.0

<210> 1  
<211> 486  
<212> DNA  
<213> Piscirickettsia salmonis

<220>  
<221> CDS  
<222> (1)..(486)

<400> 1  
atg aac aga gga tgt ttg caa ggt agt agt cta att att atc agt gtg 48  
Met Asn Arg Gly Cys Leu Gln Gly Ser Ser Leu Ile Ile Ile Ser Val

## IDC60485.US.SEQ.LIST.txt

1	5	10	15
ttt tta gtt ggc tgt gcc cag aac ttt agt cgt caa gaa gtc gga gct 96			
Phe Leu Val Gly Cys Ala Gln Asn Phe Ser Arg Gln Glu Val Gly Ala			
20	25	30	
gcg act ggg gct gtt gtt ggc ggt gtt gct ggc cag ctg ttt ggt aaa 144			
Ala Thr Gly Ala Val Val Gly Gly Val Ala Gly Gln Leu Phe Gly Lys			
35	40	45	
ggt agt ggt cga gtt gca atg gcc att ggt ggt gct gtt ttg ggt gga 192			
Gly Ser Gly Arg Val Ala Met Ala Ile Gly Gly Ala Val Leu Gly Gly			
50	55	60	
tta att ggt tct aaa atc ggt caa tcg atg gat cag cag gat aaa ata 240			
Leu Ile Gly Ser Lys Ile Gly Gln Ser Met Asp Gln Gln Asp Lys Ile			
65	70	75	80
aag cta aac cag agt ttg gaa aag gta aaa gca ggg caa gtg aca cgt 288			
Lys Leu Asn Gln Ser Leu Glu Lys Val Lys Ala Gly Gln Val Thr Arg			
85	90	95	
tgg cgt aat cca gat aca ggc aat agt tat agt gtt gag cca gtg cgt 336			
Trp Arg Asn Pro Asp Thr Gly Asn Ser Tyr Ser Val Glu Pro Val Arg			
100	105	110	
act tac cag cgt tac aat aag caa gag cgt cgc cag caa tat tgt cga 384			
Thr Tyr Gln Arg Tyr Asn Lys Gln Glu Arg Arg Gln Gln Tyr Cys Arg			
115	120	125	
gaa ttt cag caa aag gcg atg att gca ggg cag aag caa gag att tac 432			
Glu Phe Gln Gln Lys Ala Met Ile Ala Gly Gln Lys Gln Glu Ile Tyr			

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130

135

140

ggc act gca tgc cgg caa ccg gat ggt cgt tgg caa gtc att tca aca 480  
 Gly Thr Ala Cys Arg Gln Pro Asp Gly Arg Trp Gln Val Ile Ser Thr

145

150

155

160

gaa aaa  
 Glu Lys

486

<210> 2  
 <211> 162  
 <212> PRT  
 <213> *Piscirickettsia salmonis*

&lt;400&gt; 2

Met Asn Arg Gly Cys Leu Gln Gly Ser Ser Leu Ile Ile Ile Ser Val  
 1 5 10 15

Phe Leu Val Gly Cys Ala Gln Asn Phe Ser Arg Gln Glu Val Gly Ala  
 20 25 30

Ala Thr Gly Ala Val Val Gly Gly Val Ala Gly Gln Leu Phe Gly Lys  
 35 40 45

Gly Ser Gly Arg Val Ala Met Ala Ile Gly Gly Ala Val Leu Gly Gly  
 50 55 60

Leu Ile Gly Ser Lys Ile Gly Gln Ser Met Asp Gln Gln Asp Lys Ile  
 65 70 75 80

Lys Leu Asn Gln Ser Leu Glu Lys Val Lys Ala Gly Gln Val Thr Arg  
 85 90 95

Trp Arg Asn Pro Asp Thr Gly Asn Ser Tyr Ser Val Glu Pro Val Arg  
 100 105 110

Thr Tyr Gln Arg Tyr Asn Lys Gln Glu Arg Arg Gln Gln Tyr Cys Arg  
 115 120 125

Glu Phe Gln Gln Lys Ala Met Ile Ala Gly Gln Lys Gln Glu Ile Tyr

## IDC60485.US.SEQ.LIST.txt

130

135

140

Gly Thr Ala Cys Arg Gln Pro Asp Gly Arg Trp Gln Val Ile Ser Thr  
 145 150 155 160

Glu Lys

&lt;210&gt; 3

&lt;211&gt; 483

&lt;212&gt; DNA

&lt;213&gt; Piscirickettsia salmonis

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(483)

&lt;400&gt; 3

atg cgt ggt tgc ctg cag ggc agc tct ctg atc att atc tct gtt ttc 48  
 Met Arg Gly Cys Leu Gln Gly Ser Ser Leu Ile Ile Ile Ser Val Phe

1 5 10 15

ctg gtg ggt tgc gcc cag aac ttc agc cgc cag gaa gtt ggc gcg gcc 96  
 Leu Val Gly Cys Ala Gln Asn Phe Ser Arg Gln Glu Val Gly Ala Ala

20 25 30

acc ggt gcg gtt gtg ggc ggt gtt gcc ggc cag ctg ttc ggt aaa ggc 144  
 Thr Gly Ala Val Val Gly Gly Val Ala Gly Gln Leu Phe Gly Lys Gly

35 40 45

tct ggt cgt gtg tcg atg gcc atc ggc ggt gcg gtt ctg ggc ggt ctg 192  
 Ser Gly Arg Val Ser Met Ala Ile Gly Gly Ala Val Leu Gly Gly Leu

50 55 60

att ggc tct aaa atc ggt cag agc atg gac cag cag gat aaa atc aaa 240  
 Ile Gly Ser Lys Ile Gly Gln Ser Met Asp Gln Gln Asp Lys Ile Lys

65 70 75 80

IDC60485.US.SEQ.LIST.txt

ctg aac cag tct ctg gaa aaa gtg aaa gcc ggc cag gtt act cgt tgg 288  
Leu Asn Gln Ser Leu Glu Lys Val Lys Ala Gly Gln Val Thr Arg Trp

85

90

95

cgt aat ccg gac acc ggt aac agc tac tct gtg gaa ccg gtt cgc acc 336  
Arg Asn Pro Asp Thr Gly Asn Ser Tyr Ser Val Glu Pro Val Arg Thr

100

105

110

tac cag cgt tac aac aaa cag gaa cgc cgt cag cag tac tgc cgc gaa 384  
Tyr Gln Arg Tyr Asn Lys Gln Glu Arg Arg Gln Gln Tyr Cys Arg Glu

115

120

125

ttt cag cag aaa gcc atg atc gca ggt cag aaa cag gaa atc tac ggc 432  
Phe Gln Gln Lys Ala Met Ile Ala Gly Gln Lys Gln Glu Ile Tyr Gly

130

135

140

acc gcg tgc cct cag ccg gat ggc cgc tgg cag gtg att agc acc gaa 480  
Thr Ala Cys Pro Gln Pro Asp Gly Arg Trp Gln Val Ile Ser Thr Glu

145

150

155

160

aaa  
Lys

483

<210> 4  
<211> 161  
<212> PRT  
<213> Piscirickettsia salmonis

<400> 4

Met Arg Gly Cys Leu Gln Gly Ser Ser Leu Ile Ile Ile Ser Val Phe  
1 5 10 15

IDC60485.US.SEQ.LIST.txt

Leu Val Gly Cys Ala Gln Asn Phe Ser Arg Gln Glu Val Gly Ala Ala  
20 25 30

Thr Gly Ala Val Val Gly Gly Val Ala Gly Gln Leu Phe Gly Lys Gly  
35 40 45

Ser Gly Arg Val Ser Met Ala Ile Gly Gly Ala Val Leu Gly Gly Leu  
50 55 60

Ile Gly Ser Lys Ile Gly Gln Ser Met Asp Gln Gln Asp Lys Ile Lys  
65 70 75 80

Leu Asn Gln Ser Leu Glu Lys Val Lys Ala Gly Gln Val Thr Arg Trp  
85 90 95

Arg Asn Pro Asp Thr Gly Asn Ser Tyr Ser Val Glu Pro Val Arg Thr  
100 105 110

Tyr Gln Arg Tyr Asn Lys Gln Glu Arg Arg Gln Gln Tyr Cys Arg Glu  
115 120 125

Phe Gln Gln Lys Ala Met Ile Ala Gly Gln Lys Gln Glu Ile Tyr Gly  
130 135 140

Thr Ala Cys Pro Gln Pro Asp Gly Arg Trp Gln Val Ile Ser Thr Glu  
145 150 155 160

Lys

<210> 5  
<211> 768  
<212> DNA  
<213> Piscirickettsia salmonis

<220>  
<221> CDS  
<222> (1)..(768)

<220>  
<221> sig\_peptide  
<222> (1)..(285)

<220>  
<221> mat\_peptide  
<222> (286)..(768)

## IDC60485.US.SEQ.LIST.txt

&lt;400&gt; 5

atg tca gtt gaa ttc tac aac tct aac aaa tca gca caa aca aac tca 48  
 Met Ser Val Glu Phe Tyr Asn Ser Asn Lys Ser Ala Gln Thr Asn Ser

-95

-90

-85

-80

att aca cca ata atc aaa att act aac aca tct gac agt gat tta aat 96  
 Ile Thr Pro Ile Ile Lys Ile Thr Asn Thr Ser Asp Ser Asp Leu Asn

-75

-70

-65

tta aat gac gta aaa gtt aga tat tat tac aca agt gat ggt aca caa 144  
 Leu Asn Asp Val Lys Val Arg Tyr Tyr Tyr Thr Ser Asp Gly Thr Gln

-60

-55

-50

gga caa act ttc tgg tgt gac cat gct ggt gca tta tta gga aat agc 192  
 Gly Gln Thr Phe Trp Cys Asp His Ala Gly Ala Leu Leu Gly Asn Ser

-45

-40

-35

tat gtt gat aac act agc aaa gtg aca gca aac ttc gtt aaa gaa aca 240  
 Tyr Val Asp Asn Thr Ser Lys Val Thr Ala Asn Phe Val Lys Glu Thr

-30

-25

-20

gca agc cca aca tca acc tat gat aca tat ctg gat ccg tct cat atg 288  
 Ala Ser Pro Thr Ser Thr Tyr Asp Thr Tyr Leu Asp Pro Ser His Met

-15

-10

-5

1

cgt ggt tgc ctg cag ggc agc tct ctg atc att atc tct gtt ttc ctg 336  
 Arg Gly Cys Leu Gln Gly Ser Ser Leu Ile Ile Ile Ser Val Phe Leu

5

10

15

gtg ggt tgc gcc cag aac ttc agc cgc cag gaa gtt ggc gcg gcc acc 384  
 Val Gly Cys Ala Gln Asn Phe Ser Arg Gln Glu Val Gly Ala Ala Thr

20

25

30

IDC60485.US.SEQ.LIST.txt

ggt gcg gtt gtg ggc ggt gtt gcc ggc cag ctg ttc ggt aaa ggc tct 432  
Gly Ala Val Val Gly Gly Val Ala Gly Gln Leu Phe Gly Lys Gly Ser

35

40

45

ggt cgt gtg tcg atg gcc atc ggc ggt gcg gtt ctg ggc ggt ctg att 480  
Gly Arg Val Ser Met Ala Ile Gly Gly Ala Val Leu Gly Gly Leu Ile

50

55

60

65

ggc tct aaa atc ggt cag agc atg gac cag cag gat aaa atc aaa ctg 528  
Gly Ser Lys Ile Gly Gln Ser Met Asp Gln Gln Asp Lys Ile Lys Leu

70

75

80

aac cag tct ctg gaa aaa gtg aaa gcc ggc cag gtt act cgt tgg cgt 576  
Asn Gln Ser Leu Glu Lys Val Lys Ala Gly Gln Val Thr Arg Trp Arg

85

90

95

aat ccg gac acc ggt aac agc tac tct gtg gaa ccg gtt cgc acc tac 624  
Asn Pro Asp Thr Gly Asn Ser Tyr Ser Val Glu Pro Val Arg Thr Tyr

100

105

110

cag cgt tac aac aaa cag gaa cgc cgt cag cag tac tgc cgc gaa ttt 672  
Gln Arg Tyr Asn Lys Gln Glu Arg Arg Gln Gln Tyr Cys Arg Glu Phe

115

120

125

cag cag aaa gcc atg atc gca ggt cag aaa cag gaa atc tac ggc acc 720  
Gln Gln Lys Ala Met Ile Ala Gly Gln Lys Gln Glu Ile Tyr Gly Thr

130

135

140

145

gcg tgc cct cag ccg gat ggc cgc tgg cag gtg att agc acc gaa aaa 768  
Ala Cys Pro Gln Pro Asp Gly Arg Trp Gln Val Ile Ser Thr Glu Lys

150

155

160



IDC60485.US.SEQ.LIST.txt

<210> 6  
 <211> 256  
 <212> PRT  
 <213> Piscirickettsia salmonis

<220>  
 <221> SIGNAL  
 <222> (-95)..(-1)

<400> 6

Met Ser Val Glu Phe Tyr Asn Ser Asn Lys Ser Ala Gln Thr Asn Ser  
 -95 -90 -85 -80

Ile Thr Pro Ile Ile Lys Ile Thr Asn Thr Ser Asp Ser Asp Leu Asn  
 -75 -70 -65

Leu Asn Asp Val Lys Val Arg Tyr Tyr Tyr Thr Ser Asp Gly Thr Gln  
 -60 -55 -50

Gly Gln Thr Phe Trp Cys Asp His Ala Gly Ala Leu Leu Gly Asn Ser  
 -45 -40 -35

Tyr Val Asp Asn Thr Ser Lys Val Thr Ala Asn Phe Val Lys Glu Thr  
 -30 -25 -20

Ala Ser Pro Thr Ser Thr Tyr Asp Thr Tyr Leu Asp Pro Ser His Met  
 -15 -10 -5 1

Arg Gly Cys Leu Gln Gly Ser Ser Leu Ile Ile Ile Ser Val Phe Leu  
 5 10 15

Val Gly Cys Ala Gln Asn Phe Ser Arg Gln Glu Val Gly Ala Ala Thr  
 20 25 30

Gly Ala Val Val Gly Gly Val Ala Gly Gln Leu Phe Gly Lys Gly Ser  
 35 40 45

Gly Arg Val Ser Met Ala Ile Gly Gly Ala Val Leu Gly Gly Leu Ile  
 50 55 60 65

Gly Ser Lys Ile Gly Gln Ser Met Asp Gln Gln Asp Lys Ile Lys Leu  
 70 75 80

Asn Gln Ser Leu Glu Lys Val Lys Ala Gly Gln Val Thr Arg Trp Arg

## IDC60485.US.SEQ.LIST.txt

85

90

95

Asn Pro Asp Thr Gly Asn Ser Tyr Ser Val Glu Pro Val Arg Thr Tyr  
 100 105 110

Gln Arg Tyr Asn Lys Gln Glu Arg Arg Gln Gln Tyr Cys Arg Glu Phe  
 115 120 125

Gln Gln Lys Ala Met Ile Ala Gly Gln Lys Gln Glu Ile Tyr Gly Thr  
 130 135 140 145

Ala Cys Pro Gln Pro Asp Gly Arg Trp Gln Val Ile Ser Thr Glu Lys  
 150 155 160

<210> 7  
 <211> 33  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: primer

<400> 7  
 gagagaacat atgaacagag gatgtttgca agg 33

<210> 8  
 <211> 40  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: primer

<400> 8  
 gccataagct cttccgcatt tttctgttga aatgacttgc 40

<210> 9  
 <211> 111  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: primer

<400> 9

## IDC60485.US.SEQ.LIST.txt

cgccagggtt ttcccagtca cgacggatcc gtctcatatg cgtgggtgcc 50  
 tgcagggcag ctctctgatc attatctctg ttttcctggt gggttgcgcc 100  
 cagaacttca g 111

<210> 10  
 <211> 110  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: primer

<400> 10  
 tgggttgccg ccagaacttc agccgccagg aagttggcgc ggccaccggt 50  
 gcggttggtg gcggtgttgc cggccagctg ttcggtaaag gctctggtcg 100  
 tgtggcgatg 110

<210> 11  
 <211> 94  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: primer

<400> 11  
 aaaggctctg gtcgtgtggc gatggccatc ggcggtgcgg ttctgggcgg 50  
 tctgattggc tctaaaatcg gtcagagcat ggaccagcag gata 94  
 94

<210> 12  
 <211> 118  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: primer

<400> 12  
 gttccacaga gtagctgtta ccggtgtccg gattacgcca acgagtaacc 50

IDC60485.US.SEQ.LIST.txt

tggccggctt tcaactttttc cagagactgg ttcagtttga ttttatcctg 110  
ctggtccatg ctctgacc 118

<210> 13  
<211> 102  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: primer

<400> 13  
ggtgccgtag atttcctggt tctgacctgc gatcatggct ttctgctgaa 50  
attcgcgga gtaactgctga cggcggttct gtttggtgta acgctggtag gt 102  
102

<210> 14  
<211> 110  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: primer

<400> 14  
cgtcctctcg tcttggtccg aattcagata agcttatttt tcggtgctaa 50  
tcacctgcca gcggccatcc ggctgacggc acgcggtgcc gtagatttcc 100  
tgtttctgac 110

<210> 15  
<211> 10  
<212> PRT  
<213> *Piscirickettsia salmonis*

<400> 15

Pro Val Arg Thr Tyr Gln Arg Tyr Asn Lys  
1 5 10

<210> 16

IDC60485.US.SEQ.LIST.txt

<211> 20  
 <212> PRT  
 <213> Piscirickettsia salmonis

<400> 16

Pro Val Arg Thr Tyr Gln Arg Tyr Asn Lys Gln Glu Arg Arg Gln Gln  
 1 5 10 15

Tyr Cys Arg Glu  
 20

<210> 17  
 <211> 118  
 <212> DNA  
 <213> Clostridium tetani

<220>  
 <221> CDS  
 <222> (41)..(91)

<220>  
 <221> mat\_peptide  
 <222> (41)..(85)

<400> 17  
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 Gln Tyr Ile

aaa gca aac tct aaa ttc atc ggt att acc gaa ctg att aat 91  
 Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu Ile Asn  
 5 10 15

taagcttcgg accaggacga gaggacg 118

<210> 18  
 <211> 118  
 <212> DNA  
 <213> Morbillivirus measles virus

<220>  
 <221> CDS  
 <222> (41)..(91)

<220>

IDC60485.US.SEQ.LIST.txt

<221> mat\_peptide

<222> (41)..(85)

<400> 18

cgccagggtt ttcccagtca cgacggatcc gtctcatatg ctg tct gaa 49  
Leu Ser Glu

atc aaa ggt gtt atc gtt cat cgt ctg gaa ggc gtg att aat 91  
Ile Lys Gly Val Ile Val His Arg Leu Glu Gly Val Ile Asn  
5 10 15

taagcttcgg accaggacga gaggacg 118

<210> 19

<211> 15

<212> PRT

<213> Clostridium tetani

<400> 19

Gln Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu  
1 5 10 15

<210> 20

<211> 15

<212> PRT

<213> Morbillivirus measles virus

<400> 20

Leu Ser Glu Ile Lys Gly Val Ile Val His Arg Leu Glu Gly Val  
1 5 10 15